7448

37953

Facility name: Richardson Flat Tailings

Location: NW 1/4, Sec. 1; NE 1/4, Sec. 2; T 2 S, R 4 E, Summit Cty,UT

EPA Region: VIII

Person(s) in charge of the facility: United Park City Mines
309 Kearns Bldg.
Salt Lake City, Utah 84101

Name of Reviewer: _____ **Date:** _____

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

Richardson Flat Tailings consists of approximately 2 million tons of mill tailings from metal mines in the Park City area. The tailings are located in an active stream valley. Ground water, surface water and air contamination routes were scored.

Scores: $S_M = 39.13$ ($S_{gw} = 0$ $S_{sw} = 47.27$ $S_a = 48.46$)

$S_{FE} = 0$

$S_{DC} = 12.50$

FIGURE 1
HRS COVER SHEET

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0	45	1	45	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.						
2 Route Characteristics						4.2
Facility Slope and Intervening Terrain	0 1 2 3		1		3	
1-yr. 24-hr. Rainfall	0 1 2 3		1		3	
Distance to Nearest Surface Water	0 1 2 3		2		6	
Physical State	0 1 2 3		1		3	
Total Route Characteristics Score					15	
3 Containment	0 1 2 3		1		3	4.3
4 Waste Characteristics						4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)		1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)		1	8	8	
Total Waste Characteristics Score				26	26	
5 Targets						4.5
Surface Water Use	0 1 (2) 3		3	6	9	
Distance to a Sensitive Environment	(0) 1 2 3		2	0	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 (20) 24 30 32 35 40		1	20	40	
Total Targets Score				26	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				30420	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S_{SW} = 47.27			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

NOT SCORED

Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1		45	3.1
If observed release is given a score of 45, proceed to line 4 If observed release is given a score of 0, proceed to line 2					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1		18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				26	
5 Targets					3.5
Ground Water Use	0 1 2 3	3		9	
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1		40	
Total Targets Score				49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				57,330	
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =			

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Air Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] Observed Release	0 45	1	45	45	5.1
Date and Location: July 7-14, 1986 - Richardson Flat Tailings					
Sampling Protocol: Hi-volume Air Sampling					
If line [1] is 0, the S_a = 0. Enter on line [5]. If line [1] is 45, then proceed to line [2].					
[2] Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1	1	3	
Toxicity	0 1 2 3	3	9	9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8	
Total Waste Characteristics Score			18	20	
[3] Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 (18) 21 24 27 30	1	18	30	
Distance to Sensitive Environment	(0) 1 2 3	2	0	6	
Land Use	0 1 2 (3)	1	3	3	
Total Targets Score			21	39	
[4] Multiply [1] x [2] x [3]			1701 0	35,100	
[5] Divide line [4] by 35,100 and multiply by 100		S_a =	48.46		

FIGURE 9
AIR ROUTE WORK SHEET

	S	S^2
Groundwater Route Score (S_{gw})		
Surface Water Route Score (S_{sw})	47.27	2234.45
Air Route Score (S_a)	48.46	2348.37
$S_{gw}^2 + S_{sw}^2 + S_a^2$		4582.82
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		67.70
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} \,/\, 1.73 = S_M =$		39.13

FIGURE 10
WORKSHEET FOR COMPUTING S_M

NOT SCORED

Fire and Explosion Work Sheet

	Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1	Containment	1 3	1		3	7.1
2	Waste Characteristics					7.2
	Direct Evidence	0 3	1		3	
	Ignitability	0 1 2 3	1		3	
	Reactivity	0 1 2 3	1		3	
	Incompatibility	0 1 2 3	1		3	
	Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score				20	
3	Targets					7.3
	Distance to Nearest Population	0 1 2 3 4 5	1		5	
	Distance to Nearest Building	0 1 2 3	1		3	
	Distance to Sensitive Environment	0 1 2 3	1		3	
	Land Use	0 1 2 3	1		3	
	Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
	Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
	Total Targets Score				24	
4	Multiply 1 x 2 x 3				1,440	
5	Divide line 4 by 1,440 and multiply by 100		S_{FE} =			

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	(0) 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 (3)	1	3	3	8.2
3 Containment	0 (15)	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 (3)	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 (1) 2 3 4 5	4		20	
Distance to a Critical Habitat	(0) 1 2 3	4		12	
Total Targets Score			4	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			2700	21,600	
7 Divide line 6 by 21,600 and multiply by 100		S_{DC} =	12.50		

FIGURE 12
DIRECT CONTACT WORK SHEET

June 28, 1982

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Richardson Flat Tailings

LOCATION: NW 1/4, Sec. 1; NE 1/4, Sec. 2, T 2 S, R 4 E, Summit Cty, UT

GROUND WATER ROUTE NOT SCORED

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Rationale for attributing the contaminants to the facility:

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depth from the ground surface to the lowest point of waste disposal/ storage:

Net Precipitation NOT SCORED

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual lake or seasonal evaporation (list months for seasonal):

Net precipitation (subtract the above figures):

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Permeability associated with soil type:

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

* * *

3 CONTAINMENT NOT SCORED

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Basis of estimating and/or computing waste quantity:

* * *

5 TARGETS

NOT SCORED

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Distance to above well or building:

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

Total population served by ground water within a 3-mile radius:

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum): (ug/l, ppb)

	SW-1 (upgrd.)	SW-3 (dngrd)
As	14	65
Cu	12	60
Pb	147	1985

Ref. 2, Table 3; Ref. 3.

Rationale for attributing the contaminants to the facility:

Elevated levels of the above elements are found in surface tailings samples. (ug/g, ppm)

	SO-1 (bkg)	SO-4	SO-5	SO-6	SO-7
As	58	3600	1500	900	600
Cu	94	227	181	371	961
Pb	1110	3320	2650	7010	8530

Ref. 2, Table 4.

* * *

2 ROUTE CHARACTERISTICS Route characteristics not evaluated because observed release detected.

Facility Slope and Intervening Terrain

Average slope of facility in percent:

Name/description of nearest downslope surface water:

Average slope of terrain between facility and above-cited surface water body in percent:

Is the facility located either totally or partially in surface water?

NOT SCORED

Is the facility completely surrounded by areas of higher elevation?

1-Year 24-Hour Rainfall in Inches

Distance to Nearest Downslope Surface Water

Physical State of Waste

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

	Toxicity	Persistance
Arsenic	3	3
Copper	3	3
Lead	3	3
	Ref. 4.	Ref. 1, p. 18.

Compound with highest score:

Arsenic	18
Copper	18
Lead	18

Ref. 1, p. 18.

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Approximately 2 million tons.
Ref. 5.

Basis of estimating and/or computing waste quantity:

Telephone communication with Kerry Gee, Geologist/Engineer, United Park City Mines Co. Ref. 5.

160 acres (area covered by tailings) Ref. 3.
x 43560 ft^2
6969600 ft^2
x 10 ft (average depth of tailings) Ref. 6.
69696000 ft^3 ÷ 27 = 2,581,333 yd^3 or tons tailings

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Silver Creek is used for irrigation of pastureland and hay fields (Ref. 7, 8, 9) but is not used as a drinking water source (Ref. 10).

Is there tidal influence?

No.

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

None.

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

No freshwater wetland (>5 acres) within one mile of the site.

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None known.
Ref. 11.

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

The G.M. Pace Ditch (an open irrigation ditch) point of diversion from Silver Creek is located 566 feet downstream of sample station RT-SW-3 (Ref. 3, 12C). At least 276 acres of pastureland and hay fields are irrigated by water diverted from Silver Creek at the above location (Ref. 12A, 12B, 7, 8, 9).
276 acres x 1.5 (persons per acre) = 414 population served. Ref. 1.

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

276 acres irrigated
1.5 persons/acre
414

Total population served:

414

Name/description of nearest of above water bodies:

G.M. Pace Irrigation Ditch diverted from Silver Creek.

Distance to above-cited intakes, measured in stream miles.

556 feet.
Ref. 3, 12C.

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:		Upgradient (ug/m^3)	Primary Downgradient (ug/m^3)
DAY 1	As	.0019	.0928
(7/7/87)	Cd	.0010	.0825
	Pb	.0161	1.6478
	Zn	.0292	1.1546

Ref. 13, Table 4.

Date and location of detection of contaminants

Hi-volume air sampling was conducted July 7-14, 1986. See Ref. 13, Fig. 2 for sample station locations.

Methods used to detect the contaminants:

Hi-volume air sampling was conducted from July 7-14, 1986. Methods are described in Ref. 13.

Rationale for attributing the contaminants to the site:

Elevated levels of the above elements were found in surface tailings samples.

	SO-1 (bkg)	SO-4	SO-5	SO-6	SO-7
		(ug/g, ppm)			
As	58	3600	1500	900	600
Cd	17	47	40	80	58
Pb	1110	3320	2650	7010	8530
Zn	1570	6363	5400	5870	3780

Ref. 2, Table 4.

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Arsenic - unstable at elevated temperatures; may react with water, but not violently. Ref. 21.
Assigned value = 1 Ref. 3, p. 41.

Most incompatible pair of compounds:

None.

Toxicity

Most toxic compound:

Arsenic	3
Cadmium	3
Lead	3
Zinc	3

Ref. 4.

Hazardous Waste Quantity

Total quantity of hazardous waste:
Approximately 2 million tons.
Ref. 5.

Basis of estimating and/or computing waste quantity:

160 acres (area covered by tailings) Ref. 3
43560 ft^2
6969600 ft^2
x 10 ft (average depth of tailings) Ref. 6
69696000 ft^3 ÷ 27 = 2581333 yd^3 or tons tailings

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi **0 to 1 mi** **0 to 1/2 mi** **0 to 1/4 mi**

4500 Park City population
Ref. 14.

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

No coastal wetlands in Utah.

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

No 5-acre freshwater wetland within 1 mile of the site.

Distance to critical habitat of an endangered species, if 1 mile or less:

None. Ref. 11.

Land Use

Distance to commercial/industrial area, if 1 mile or less:

1.5 miles to commercial/industrial area.

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

6 miles - Wasatch National Forest.
Ref. 3.

Distance to residential area, if 2 miles or less:

1.5 miles to residential area (note, the tailings area southwest of Richardson Flat taiings is currently developed as a residential and commercial complex). Ref. 3.

Distance to agricultural land in production within past 5 years, if 1 mile or less:

0 miles; cattle and sheep graze the adjacent shrubland and were observed on the tailings during the site investigation (6/19-20/85). See Ref. 13, App. IV. Pasture grass is grown in the valley along Silver Creek and is used as winter hay supply. Ref. 7, 8, 9, 12. Assigned value = 3.

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

None within 2 miles.

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

No.

FIRE AND EXPLOSION NOT SCORED

1 CONTAINMENT

Hazardous substances present:

Type of containment, if applicable:

* * *

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

* * *

NOT SCORED

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to Sensitive Environment

Distance to wetlands:

Distance to critical habitat:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

NOT SCORED

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

Population Within 2-Mile Radius

Buildings Within 2-Mile Radius

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

No reported incidents.

* * *

2 ACCESSIBILITY

Describe type of barrier(s):

Barriers do not completely surround the facility (site visits 6/19, 20/85. 7/30, 31/85, 8/1, 2/85, 7/7 - 14/86.

Assigned value = 3 Ref. 1, p. 59.

* * *

3 CONTAINMENT

Type of containment, if applicable:

Surface impoundment with cover depth less than 2 feet.

Assigned value = 15 Ref. 1, p. 59.

* * *

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

	Toxicity	
Arsenic	3	
Cadmium	3	
Copper	3	
Lead	3	Ref. 2, table 3, Ref. 13, table 4

Compound with highest score:

All score 3
Ref. 4

* * *

5 TARGETS

Population within one-mile radius

3 homes
x 3.8
11.4

Ref.
Assigned value = 1

Distance to critical habitat (of endangered species)

None in area.
Ref. 11

HRS DOCUMENTATION LOG SHEET

SITE NAME Richardson Flat Tailings
CITY Park City **STATE** UT
IDENTIFICATION NUMBER UTD980952840

REFERENCE NUMBER	DESCRIPTION OF THE REFERENCE
1	Uncontrolled Hazardous Waste Site Ranking System - A Users Manual;
	U.S. EPA; 1984.
2	Analytical Results Report for Richardson Flat Tailings; S. Kennedy,
	Ecology and Environment, Inc. (E&E); 10/25/85, TDD R8-8508-07.
3	Radius of Influence Map for Richardson Flat Tailings.
4	Dangerous Properties of Industrial Materials; 5th ed., N.I. Sax, 1979.
5	Telecon: J. Holcomb (E&E) to K. Gee (UPCM); 7/12/85.
6	Drilling Log for Boring RT-2 in Report of Sampling Activities for
	Richardson Flat Tailings; S. Kennedy, E&E; 9/30/85.
7	Telecon: S. Kennedy (E&E) to J. Anderson (Utah Div. of Water Rights);
	7/18/85.
8	Telecon: S. Kennedy (E&E) to M. Oliver (J.J. Johnson & Assoc.); 7/18/85.
9	Telecon: S. Kennedy (E&E) to S. Pace (Silver Creek Irrigation Co.); 7/18/85
10	Telecon: S. Kennedy (E&E) to C. Mize (Utah Bur. of Public Water Supply);
	7/17/85.
11	Telecon: S. Kennedy (E&E) to L. England (U.S. Fish & Wildlife Service);
	9/4/85.
12	Utah Div. of Water Rights Information Packet; 8/13/87; Includes A) Proposed
	Determinaiton (1924); B) Weber River Decree (1937); and C) Blue-line
	Drainage Plats (1920's).
13	Analytical Results Report of Air Sampling at Richardson Flat Tailings;
	H. Schmelzer, E&E; 8/24/87; TDD R8-8608-05.

HRS DOCUMENTATION LOG SHEET

SITE NAME Richardson Flat Tailings
CITY Park City **STATE** UT
IDENTIFICATION NUMBER UTD980952840

REFERENCE NUMBER	DESCRIPTION OF THE REFERENCE
14	Telecon: S. Kennedy (E&E) to J. Harrington (Park City Planning
	Division); 9/4/85.
15	Memo to File: A. Sackman, E & E, 09/02/87.